FIG. 1(a)

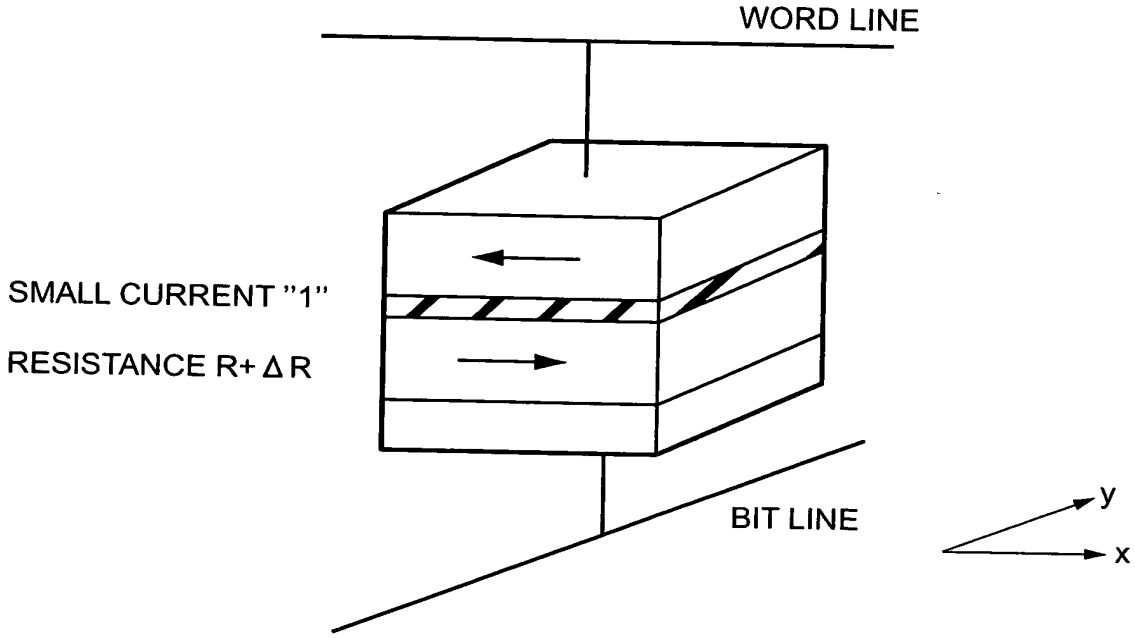

WORD LINE
SMALL CURRENT "1"
RESISTANCE R+ΔR
BIT LINE
y
x

FIG. 1(b)

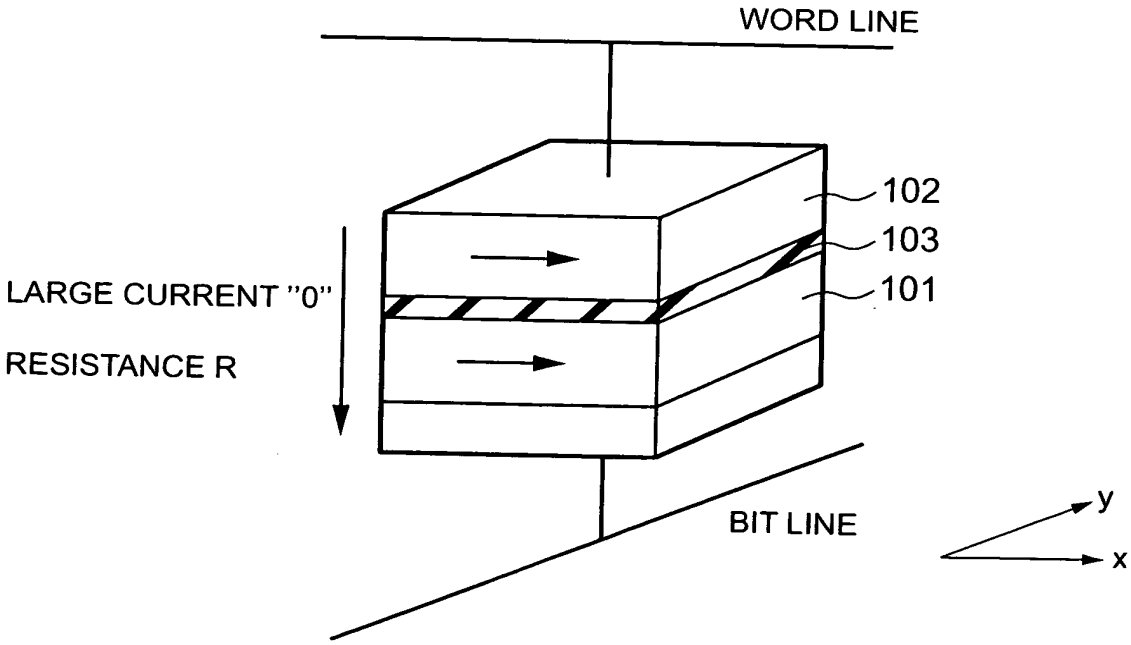

WORD LINE
102
103
101
LARGE CURRENT "0"
RESISTANCE R
BIT LINE
y
x

FIG. 2

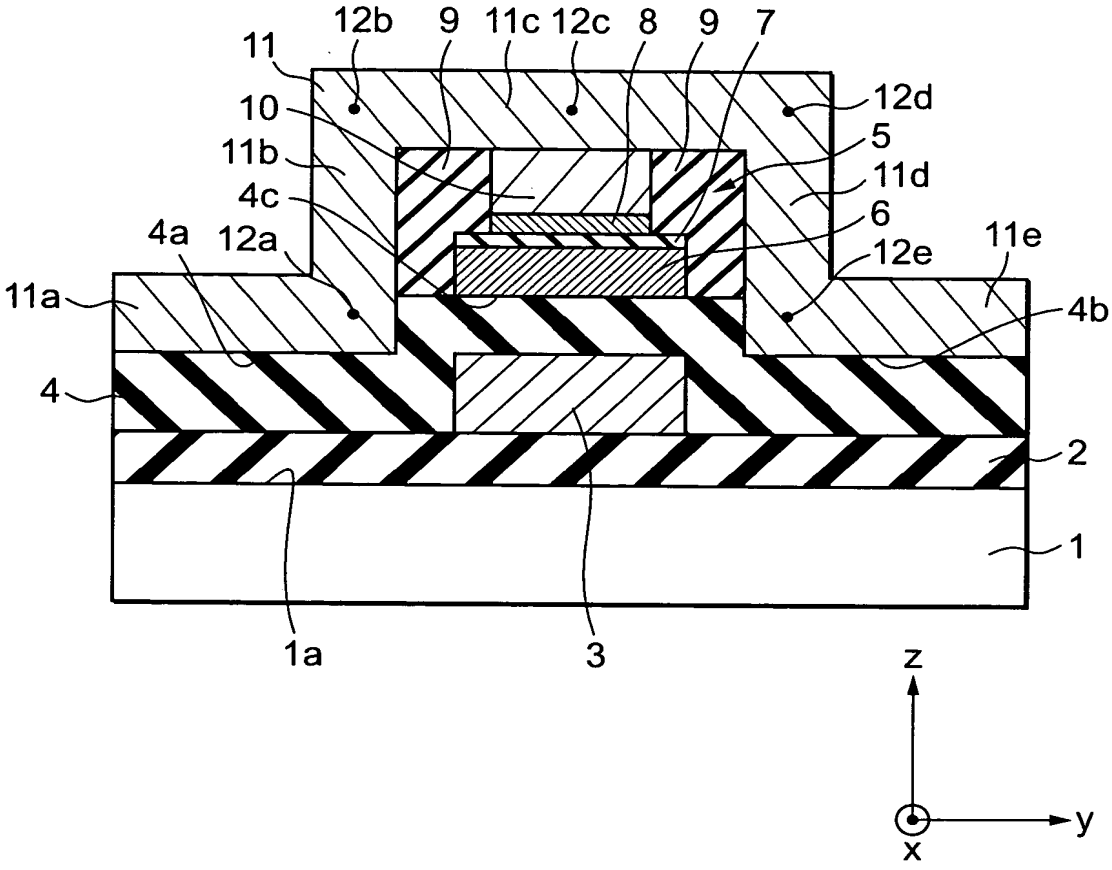

12b
9
11c
12c
8
9
7
11
10
11b
4c
4a
12a
11a
4
12d
5
11d
6
12e
11e
4b
2
1
1a
3
z
y
x

FIG. 3

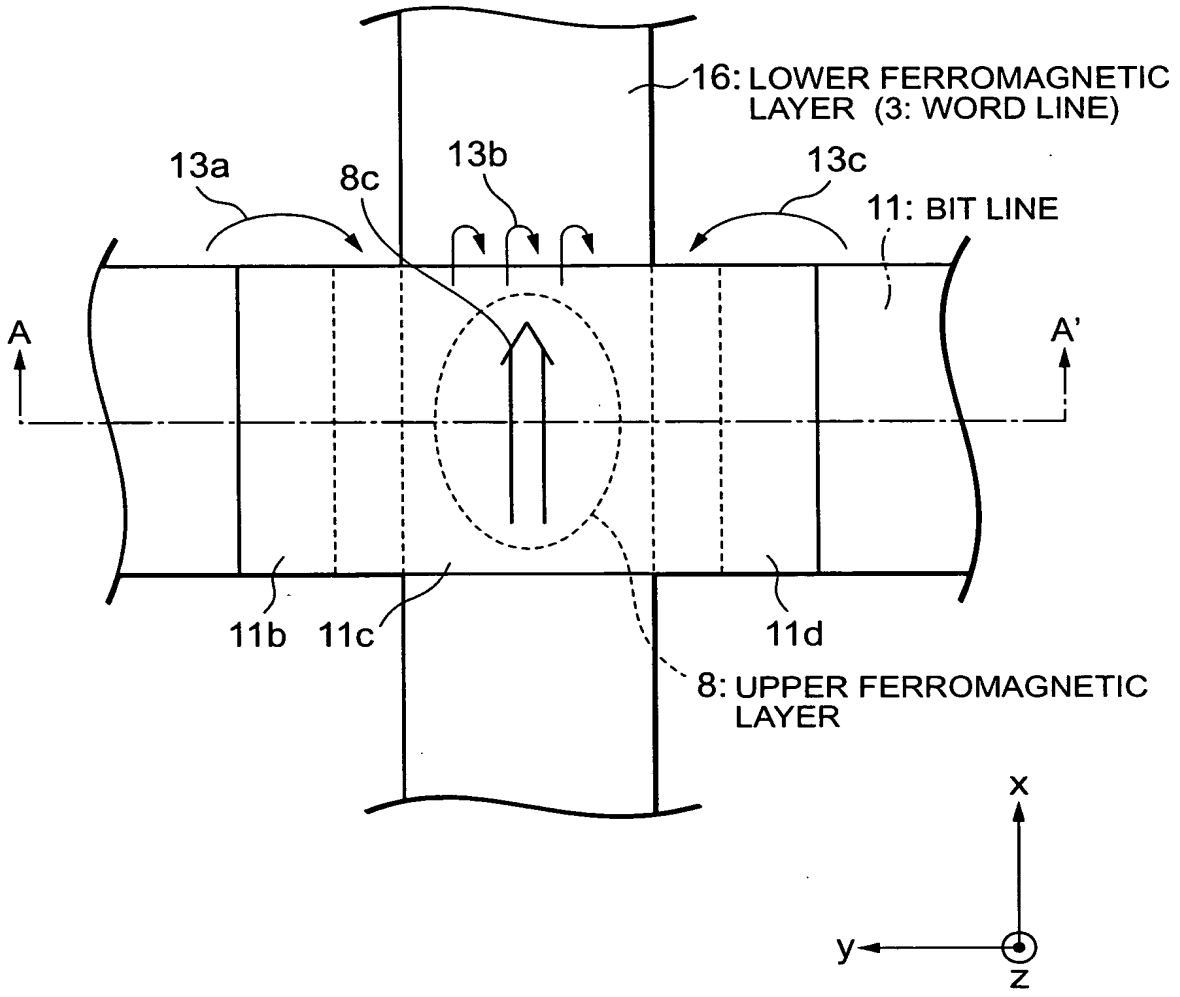

16: LOWER FERROMAGNETIC LAYER (3: WORD LINE)
13a
8c
13b
13c
11: BIT LINE
A
A'
11b
11c
11d
8: UPPER FERROMAGNETIC LAYER
x
y
z

FIG. 4

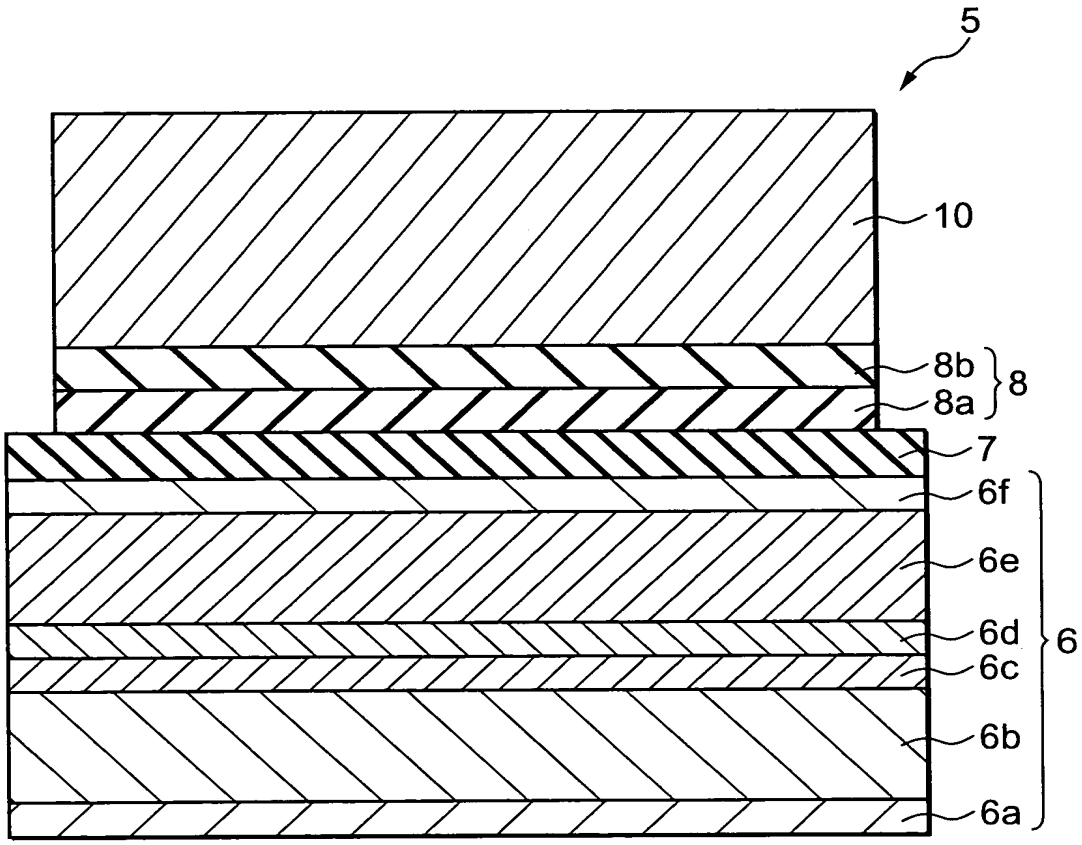


FIG. 5

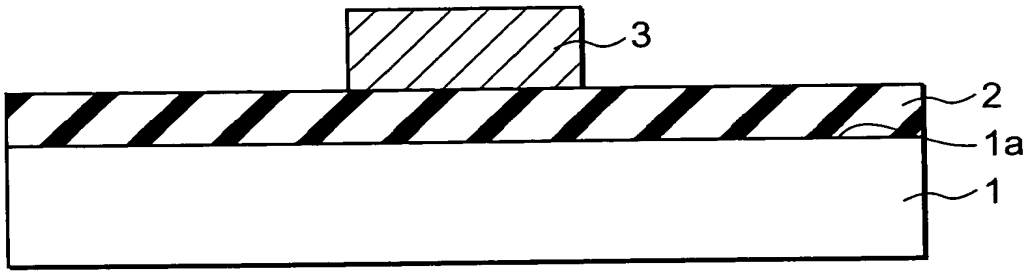


FIG. 6

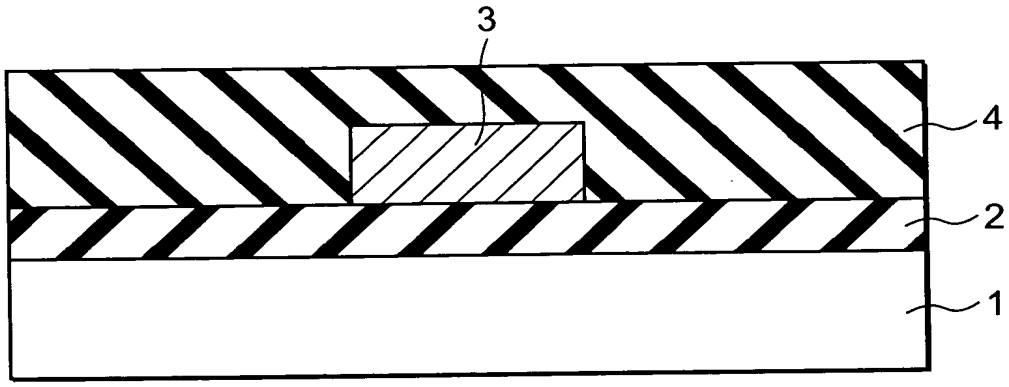


FIG. 7

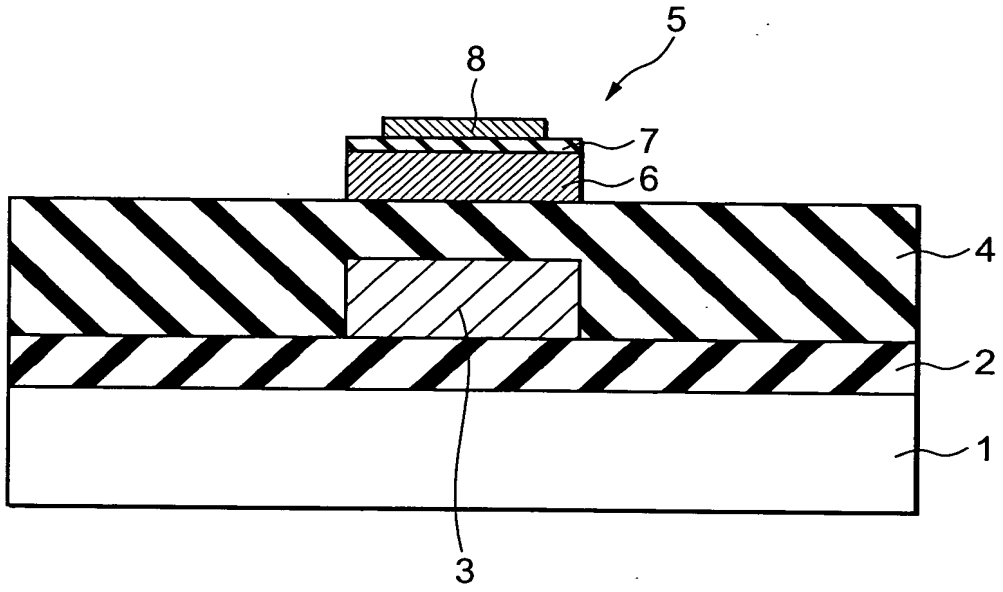


FIG. 8

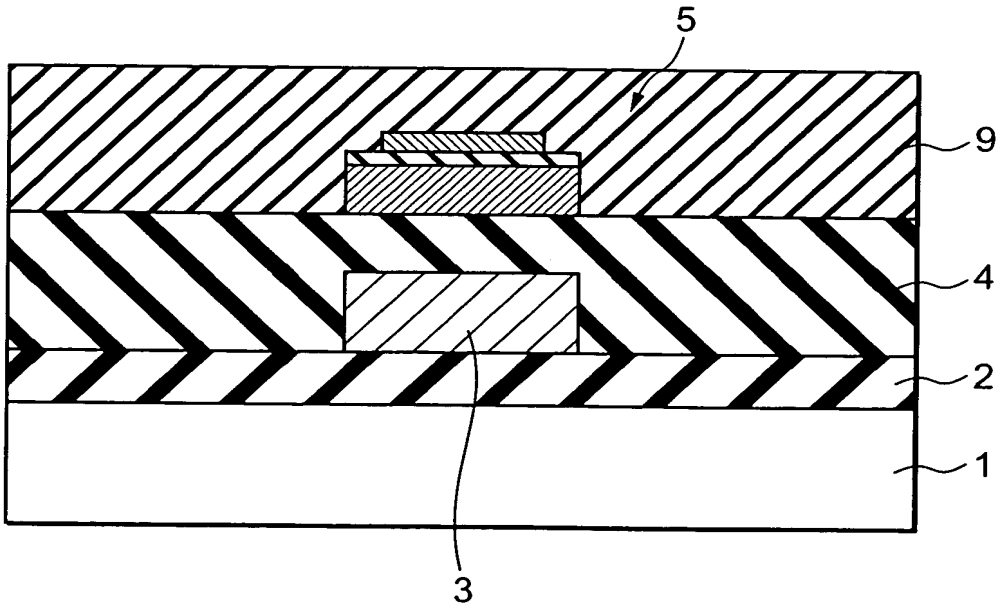


FIG. 9

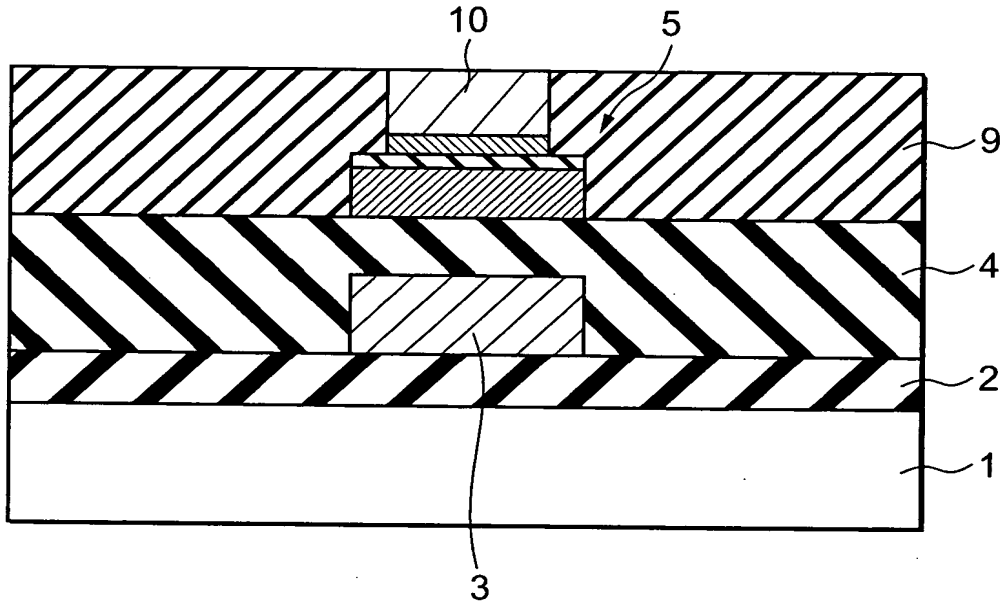


FIG. 10

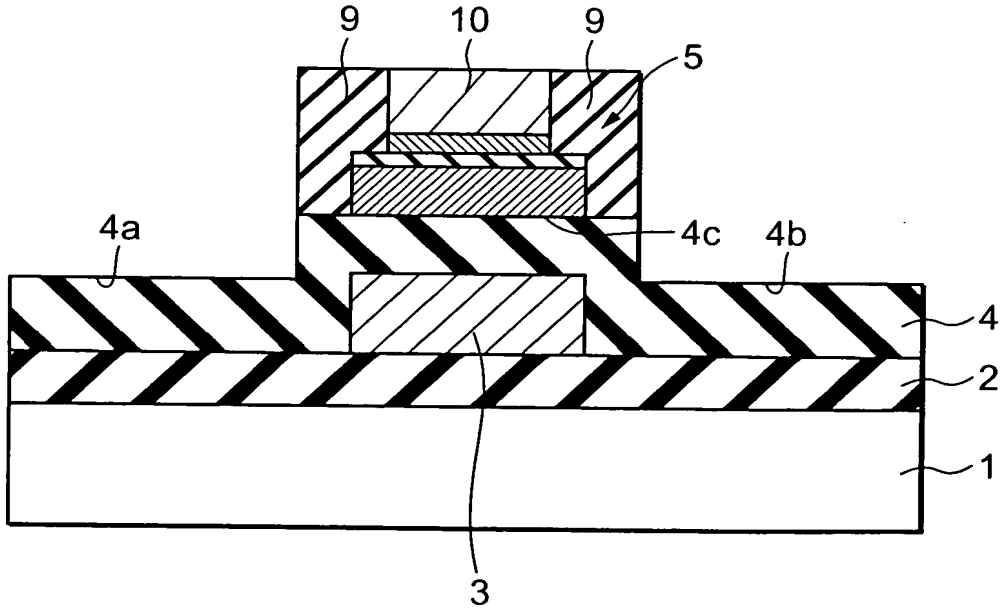


FIG. 11

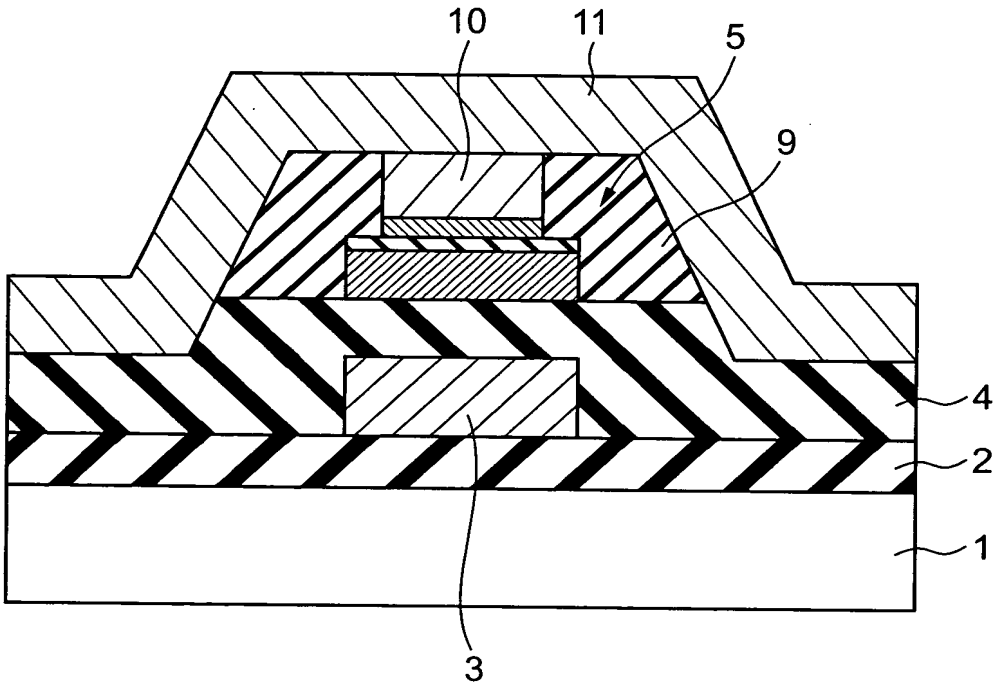


FIG. 12

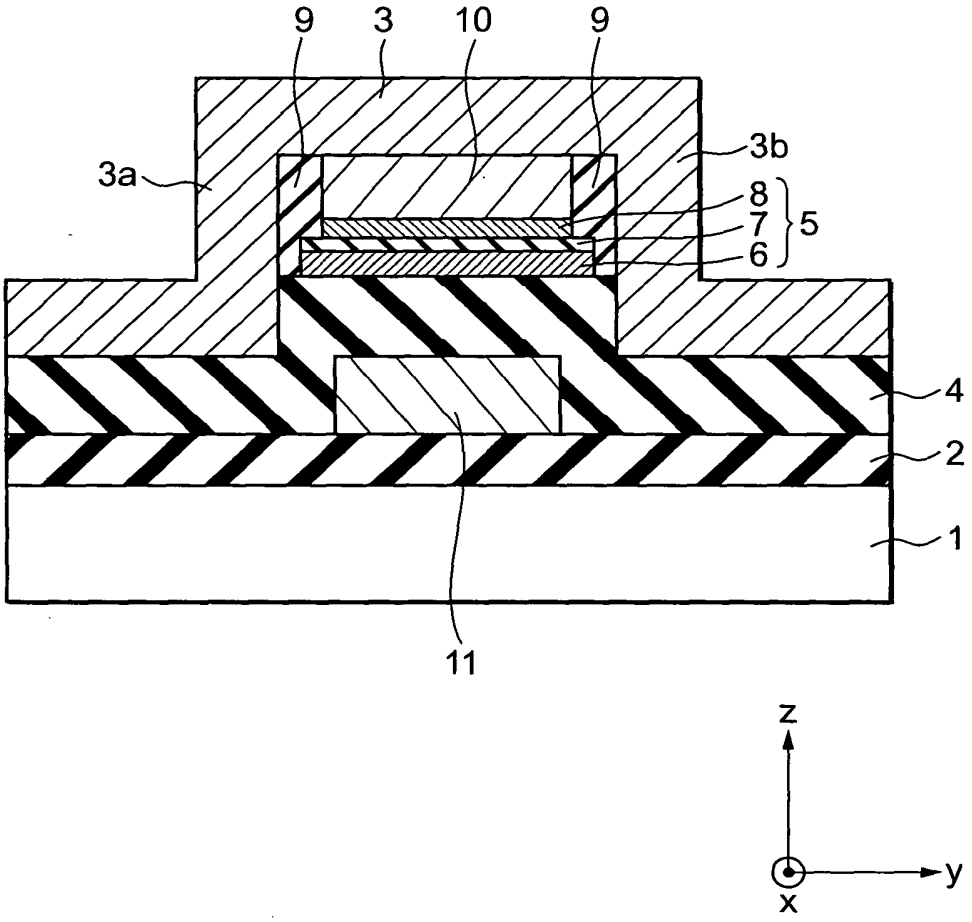


FIG. 13

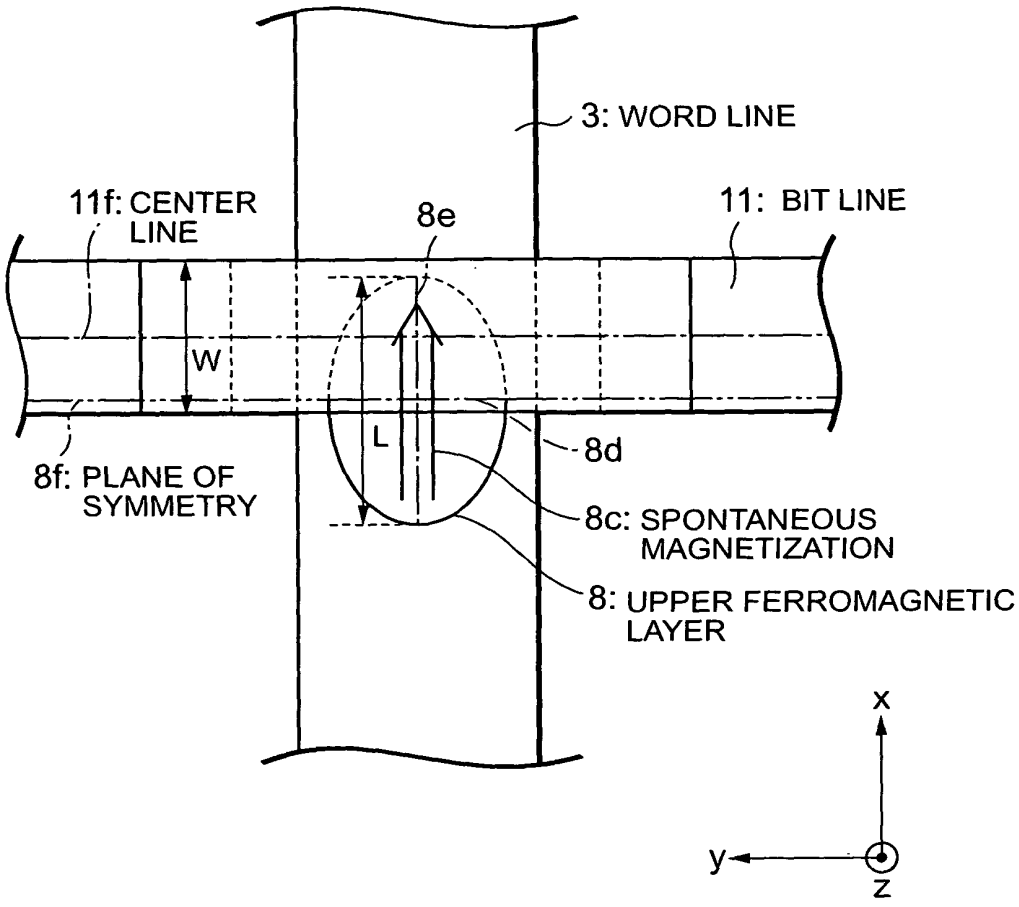

3: WORD LINE
11f: CENTER LINE
8e
11: BIT LINE
W
L
8d
8f: PLANE OF SYMMETRY
8c: SPONTANEOUS MAGNETIZATION
8: UPPER FERROMAGNETIC LAYER
x
y
z

FIG. 14

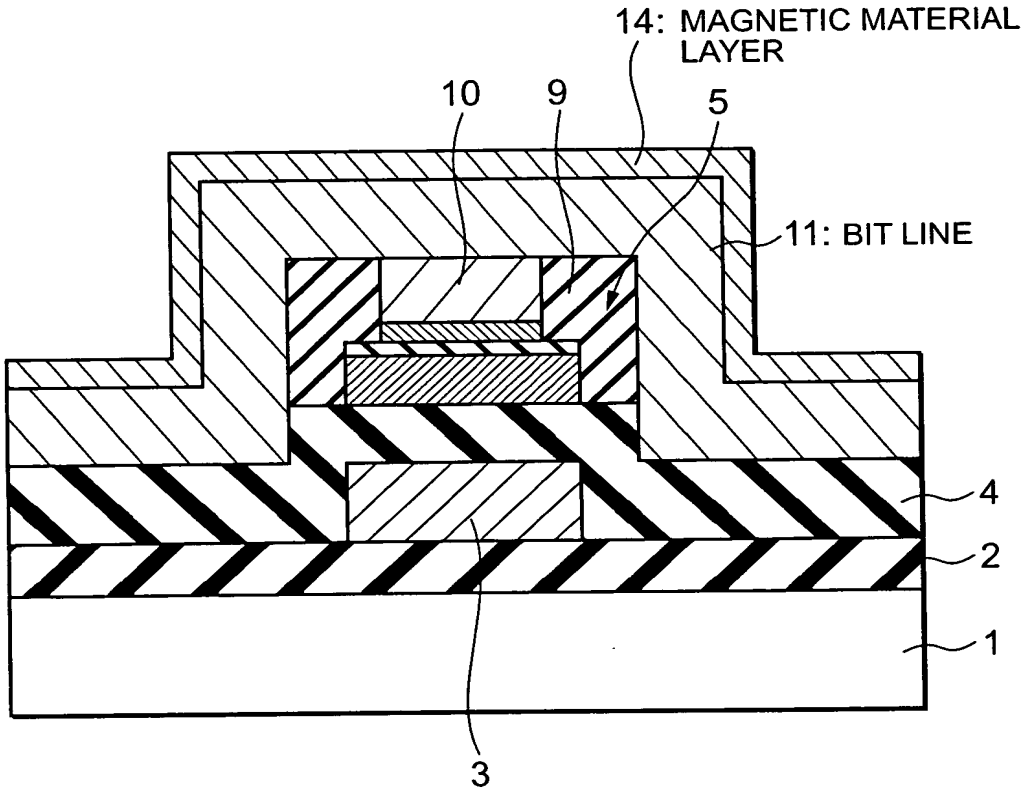


FIG. 15

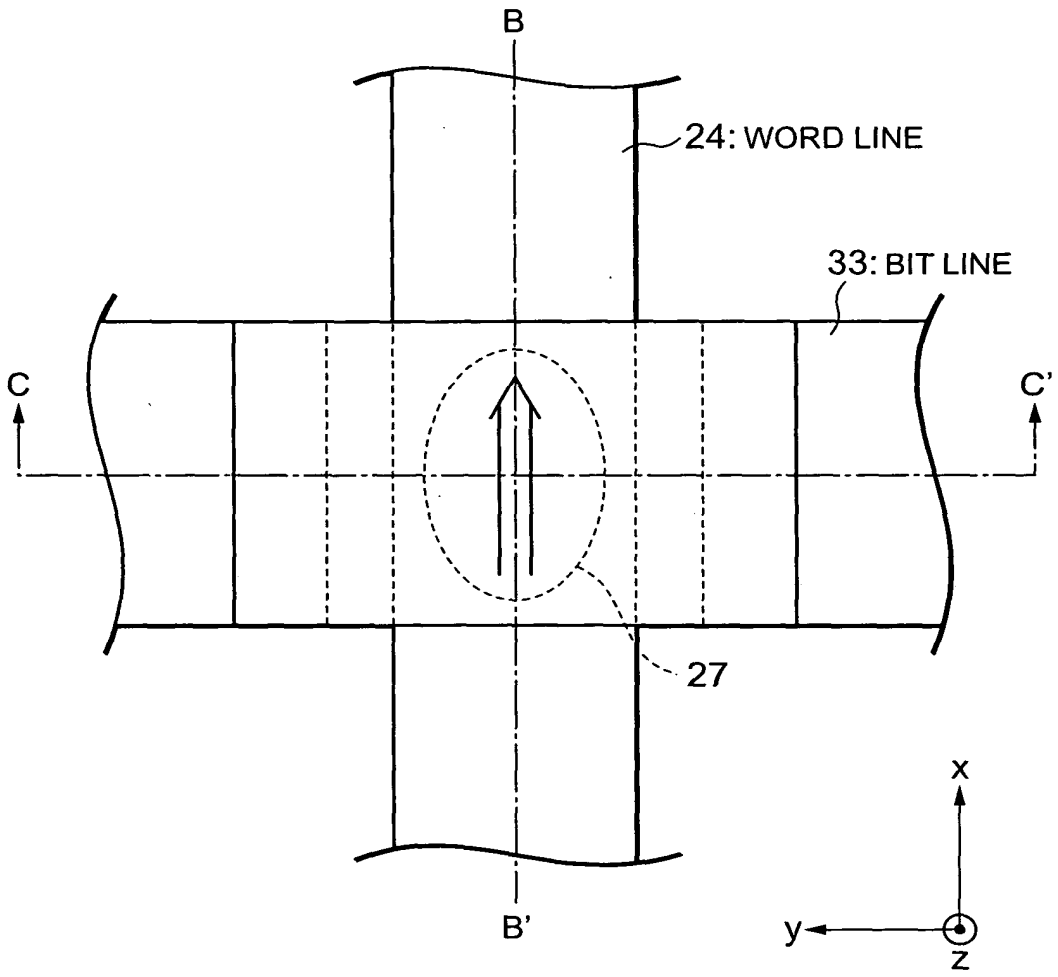


FIG. 16

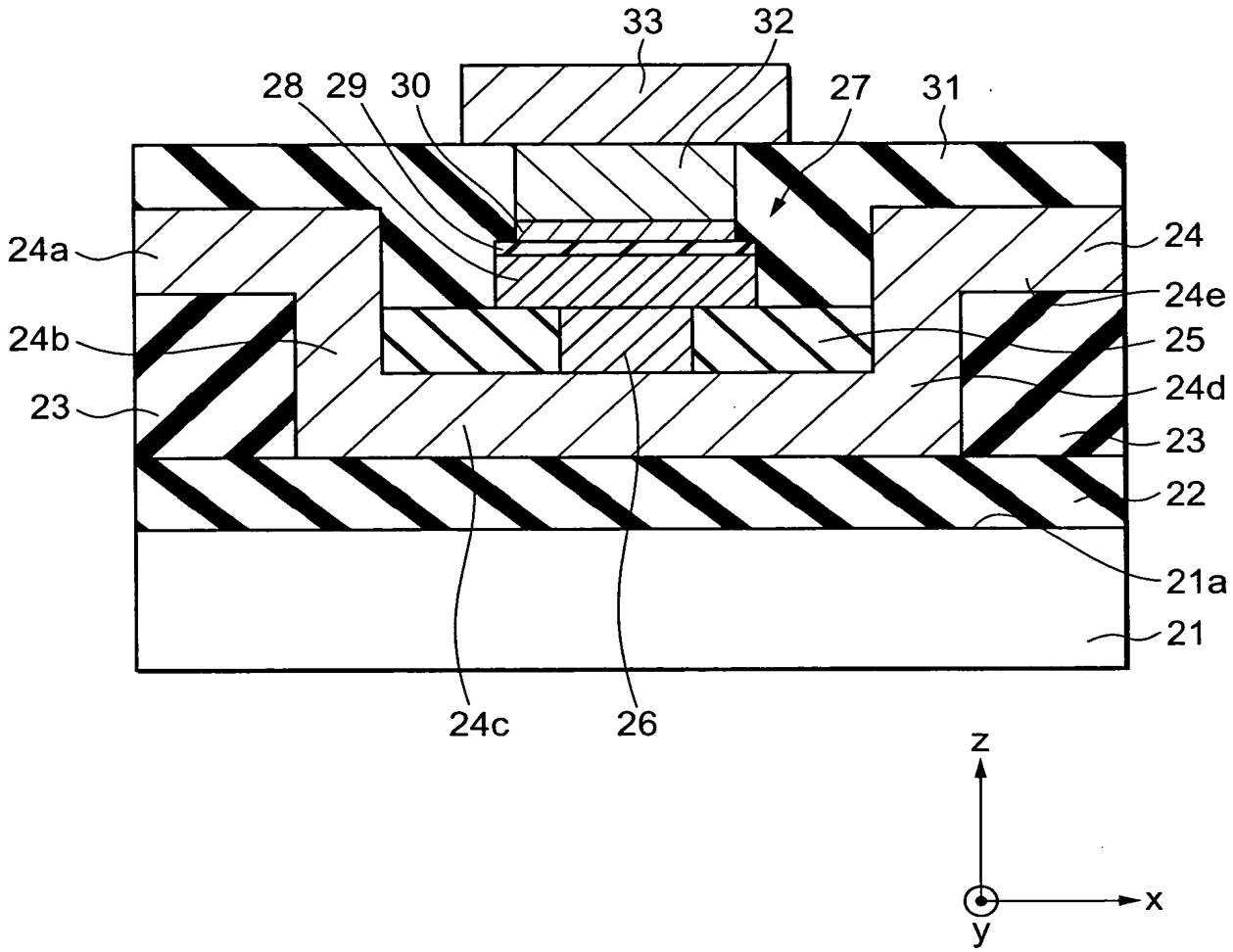


FIG. 17

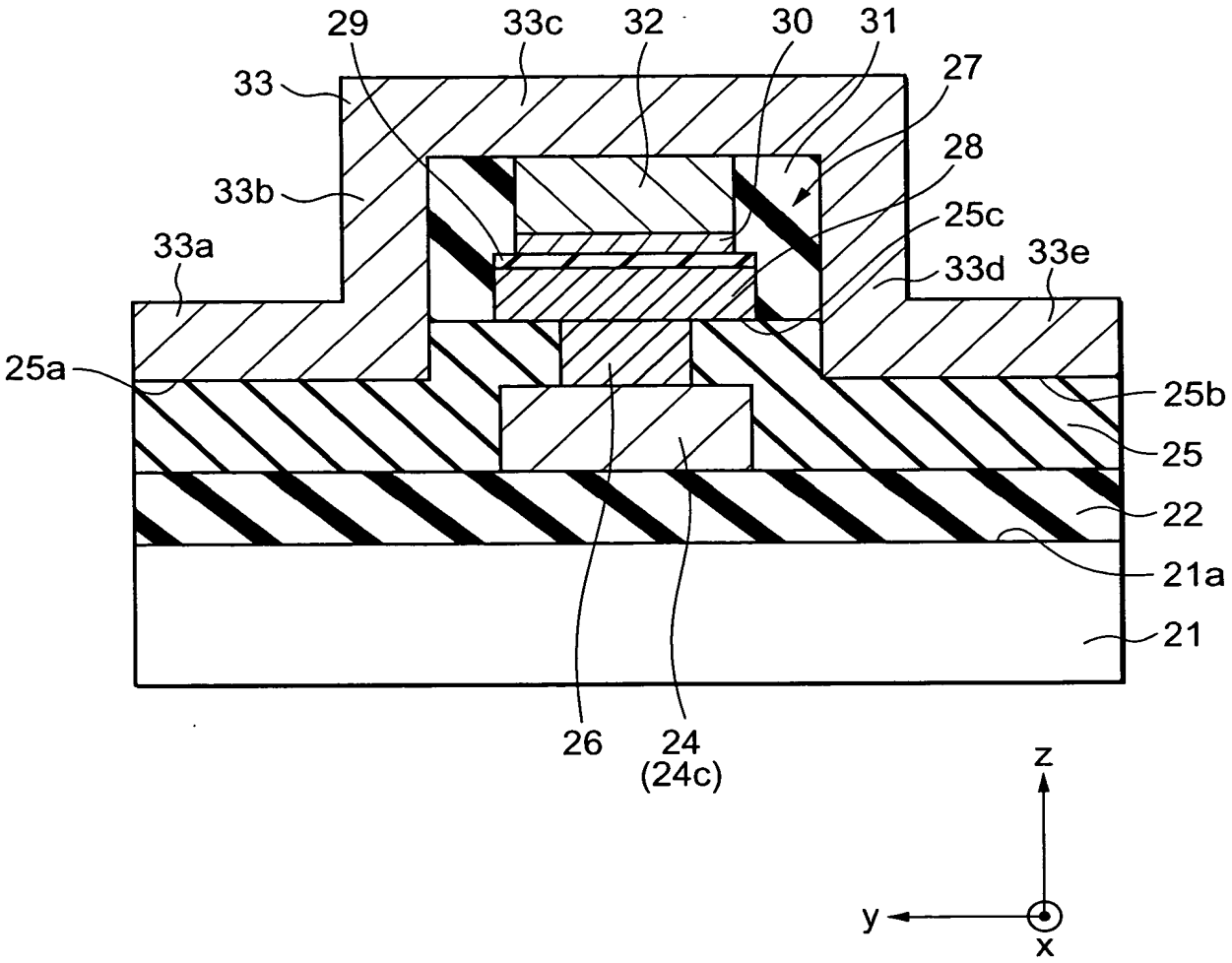

29
33c
32
30
31
27
33
28
33b
25c
33a
33d
33e
25a
25b
25
22
21a
21
26
24
(24c)
z
y
x

FIG. 18

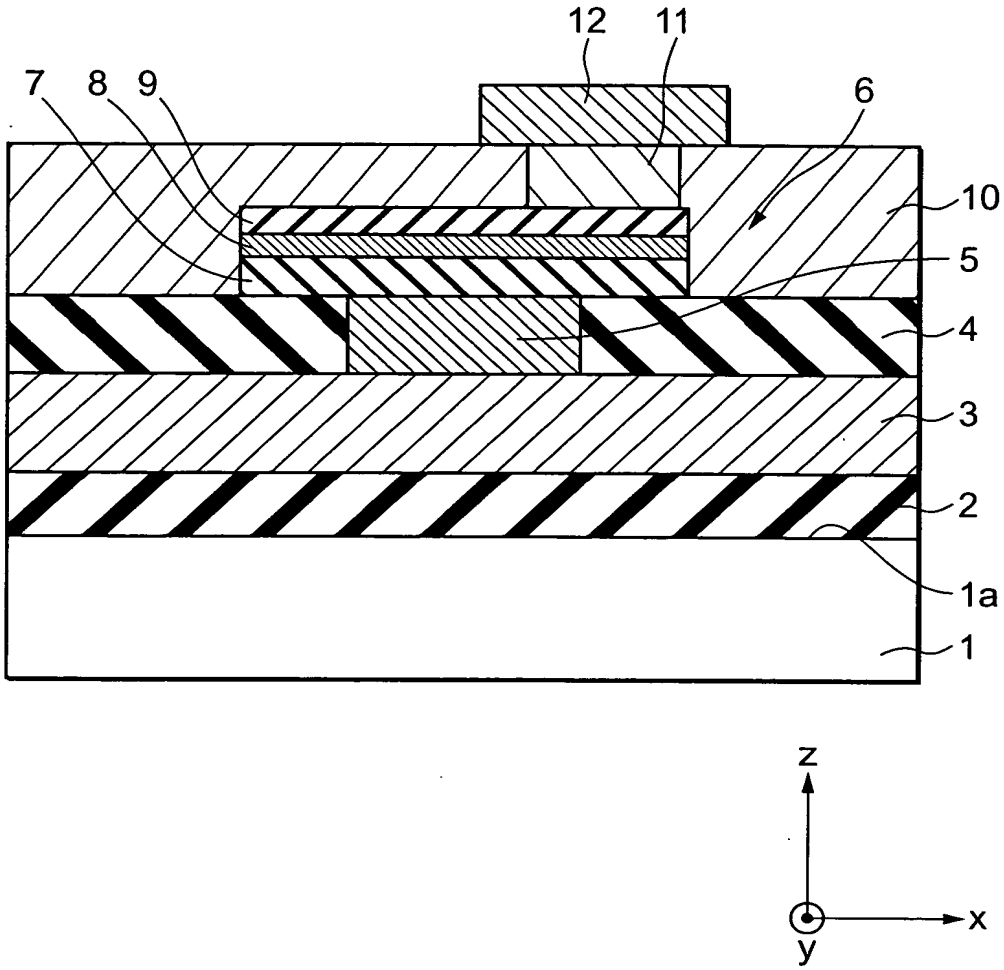


FIG. 19

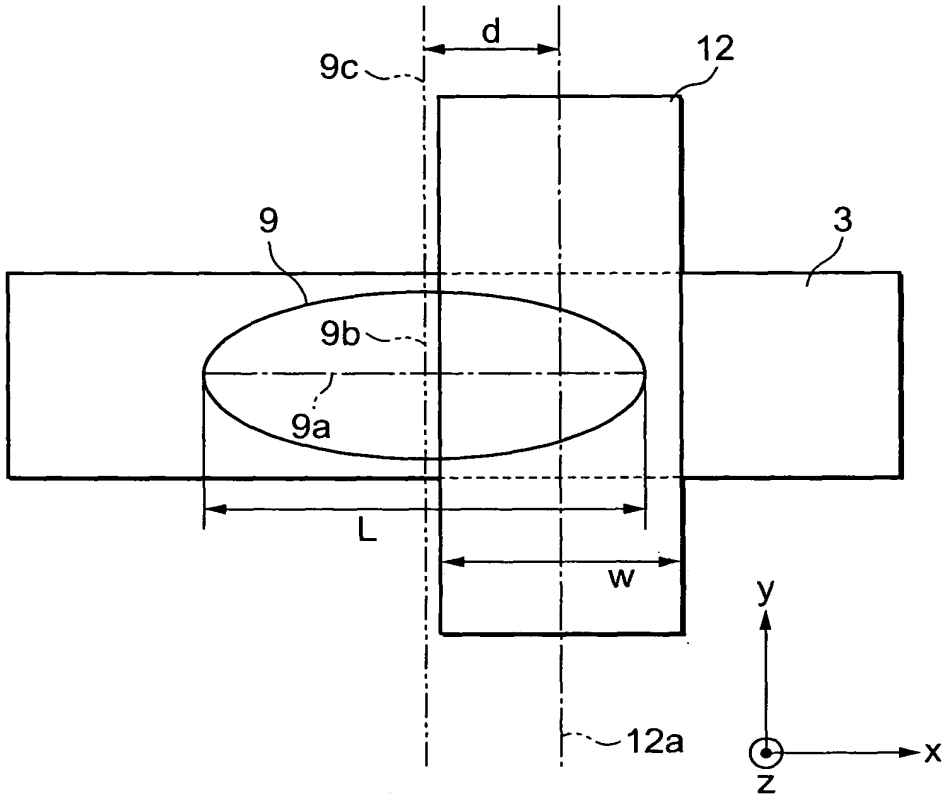
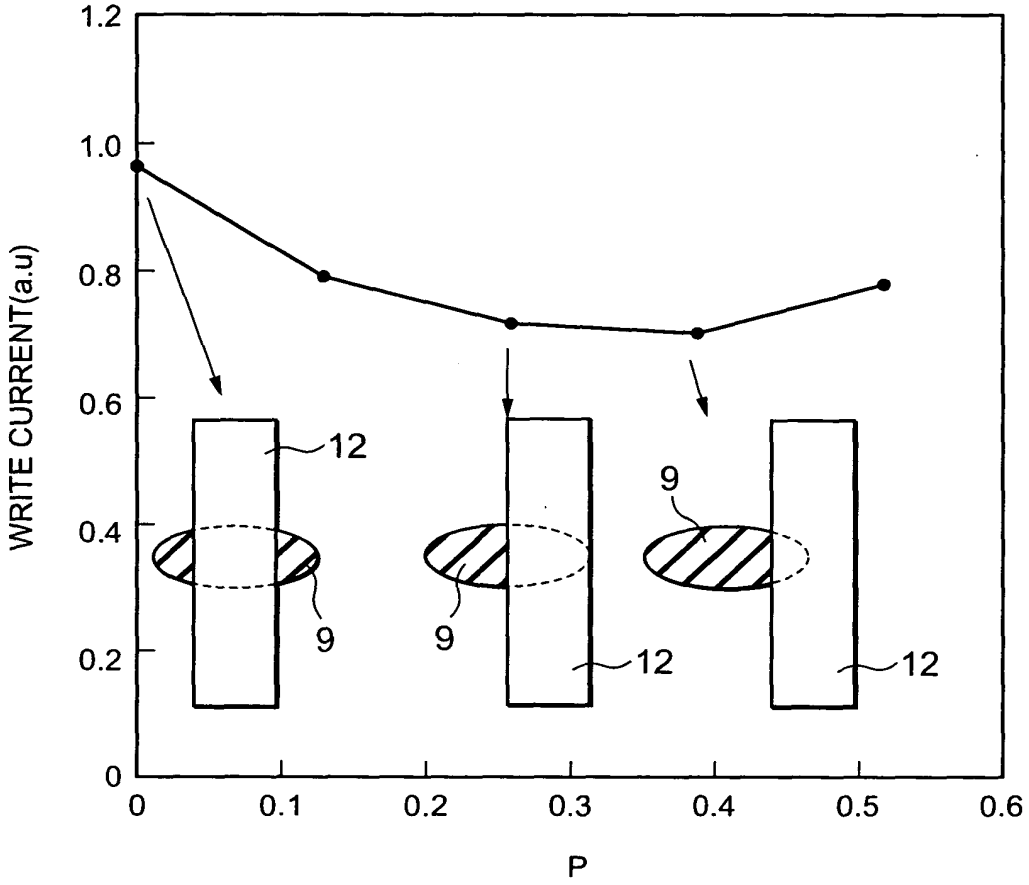


FIG. 20



$$P = \frac{d}{L}$$

d: DISTANCE BETWEEN THE CENTER LINE 12A OF THE BIT LINE 12 AND THE MINOR AXIS 9B OF THE FREE FERROMAGNETIC LAYER 9
L: LENGTH OF THE FREE FERROMAGNETIC LAYER 9 IN THE X-AXIS DIRECTION

FIG. 21

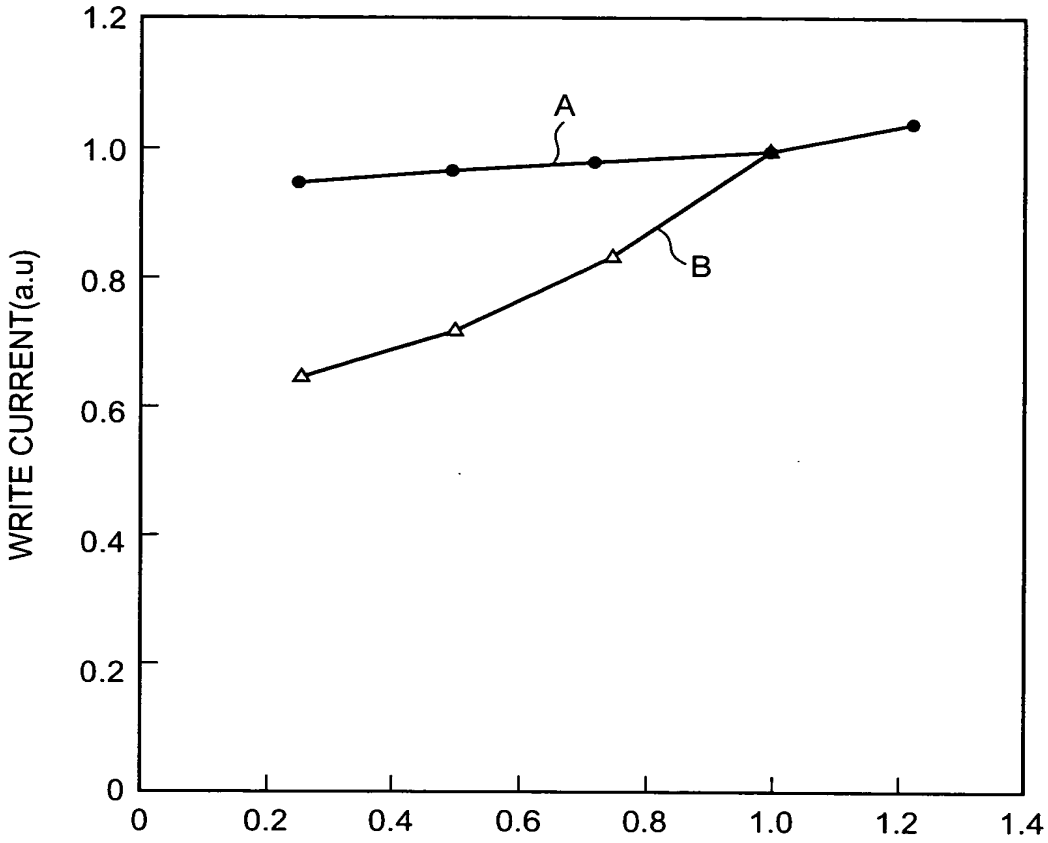

1.2
1.0
0.8
0.6
0.4
0.2
0
WRITE CURRENT(a.u)
A
B
0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
WIDTH W OF THE BIT LINE 12/LENGTH L OF THE FREE FERROMAGNETIC LAYER 9

FIG. 22

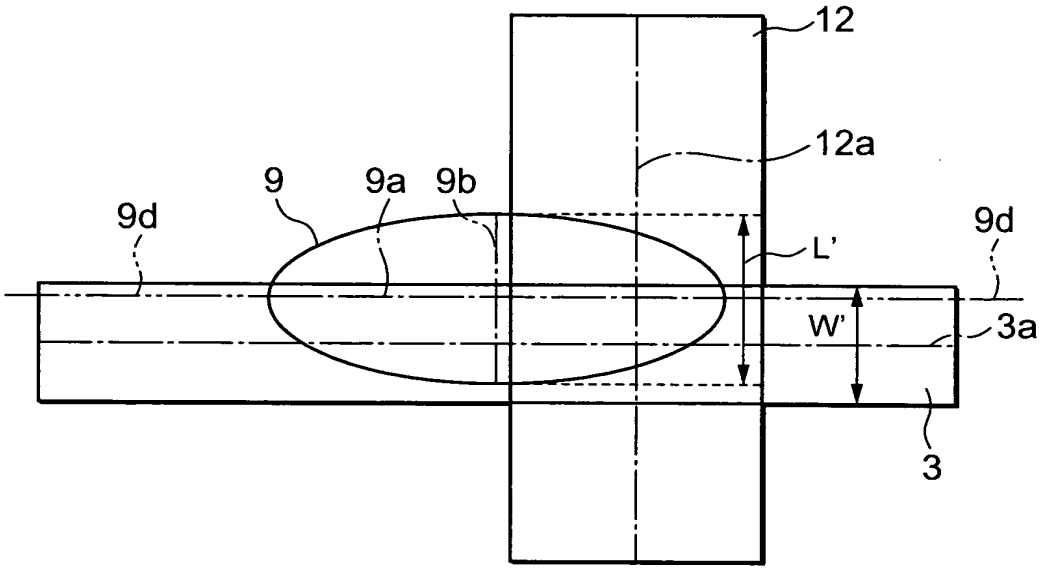


FIG. 23

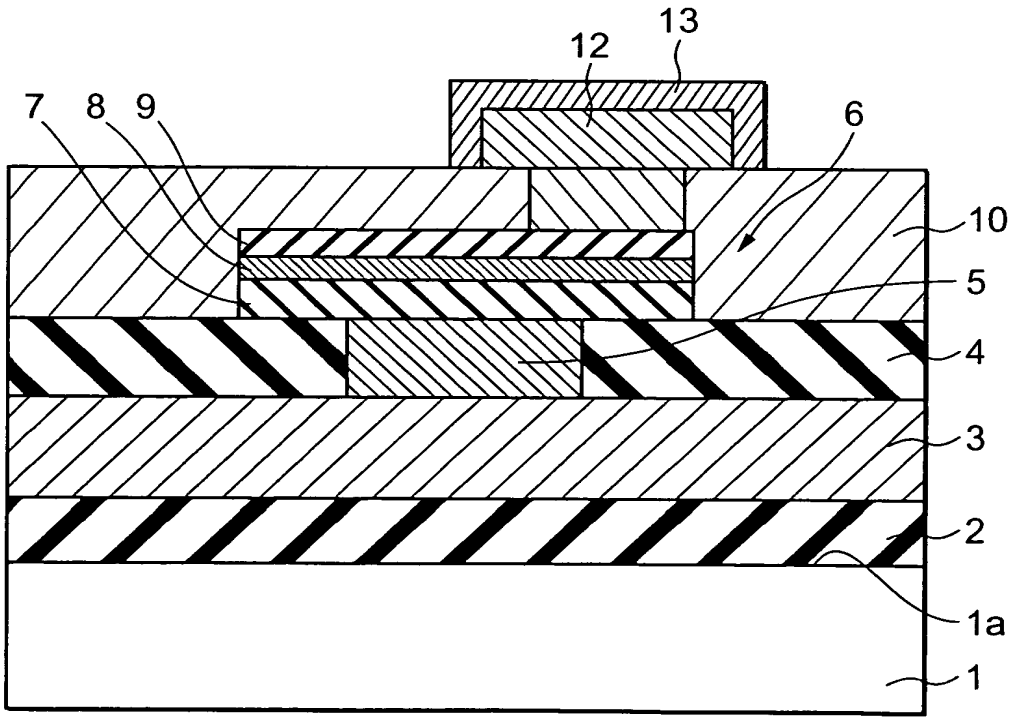


FIG. 24

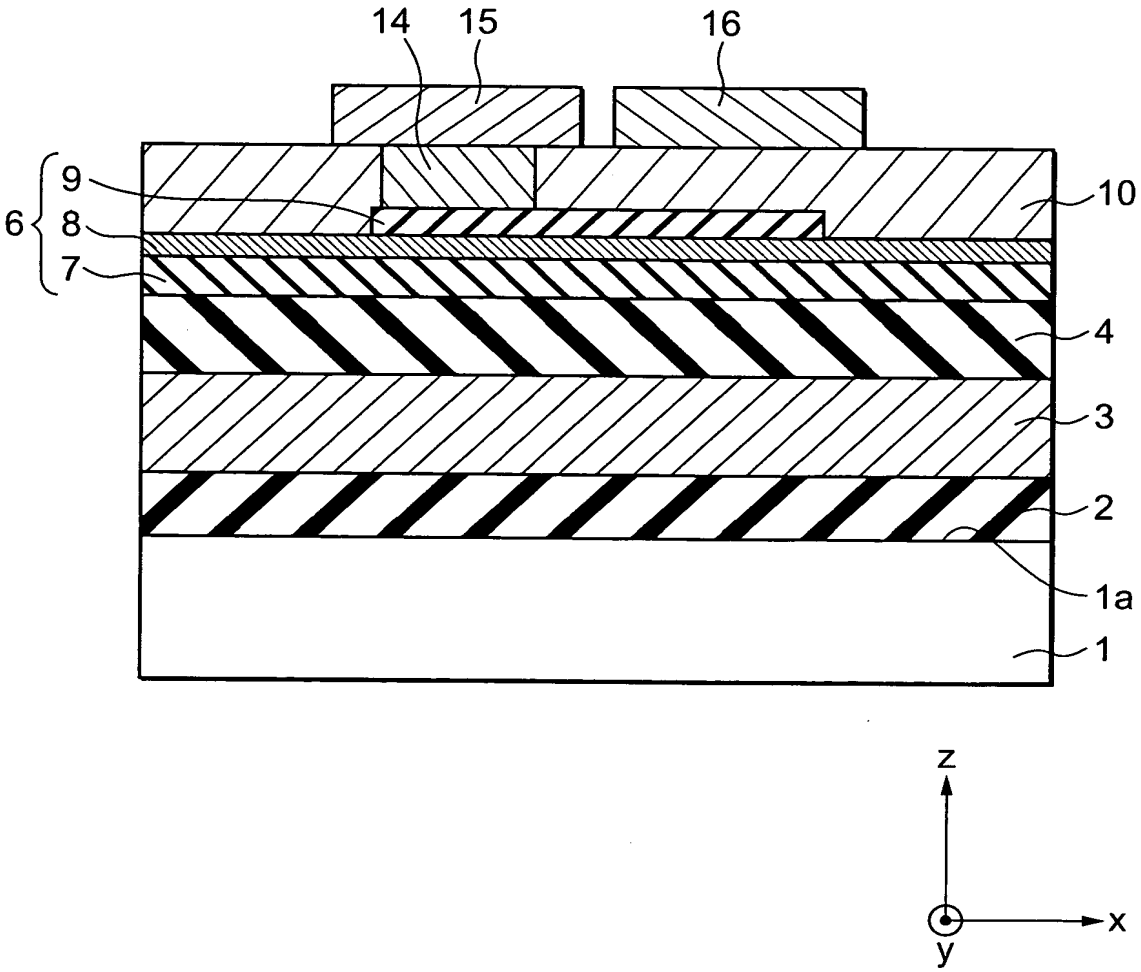
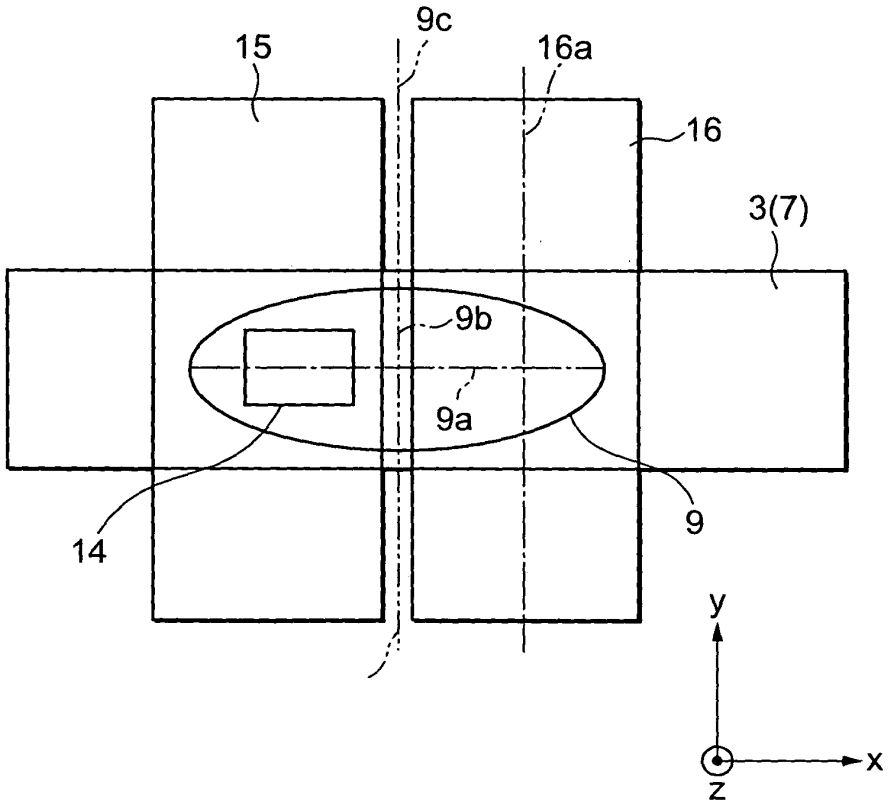



FIG. 25